

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Atty. Docket: FORSTER1

In re Application of:	)	Conf. No.: 9763
	)	
FORSTER et al	)	Art Unit: 1761
	)	
Appln. No.: 10/724,237	)	Examiner: S. L Weinstein
	)	
Date Filed: December 1, 2003	)	Washington, D.C.
	)	
For: METHOD OF PRODUCING A...	)	

DECLARATION UNDER 37 CFR 1.132

Honorable Commissioner for Patents  
U.S. Patent and Trademark Office  
Customer Service Window  
Randolph Building, Mail Stop AF  
401 Dulany Street  
Alexandria, VA 22314

Sir:

I, Manfred Gehrig, do hereby declare that I am working in the field of processing of hops and extraction of components of hops by means of pressurized gases.

Extraction using CO<sub>2</sub> was first used for decaffeinating coffee. I hereby declare that I was involved in the introduction of this technique. Other natural substances have been subjected to CO<sub>2</sub> extraction for more than 25 years.

Previously, hops were subject to dichloromethane extraction. This process make it possible to obtain important ingredients for brewing beer, particularly humulons and

lupulones, other soft resins, and aromatic compounds. In subsequent extraction using hot water, the so-called tanning agents containing polyphenols were obtained. When using aqueous ethanol for extraction, both important brewing ingredients and some polyphenol tanning agents are extracted.

With currently used CO<sub>2</sub> extraction processes, at pressures of about 250 bar, no tanning agents/polyphenols are extracted. One skilled in the art knows that the solvating capacity of CO<sub>2</sub> depends on the density of the CO<sub>2</sub>, which is 820 kg/m<sup>3</sup> at a pressure of 250 bar and a temperature of 50°C. When the pressure and temperature are increased, the density of the supercritical CO<sub>2</sub> does not significantly increase, e.g., the density is 960 kg/m<sup>3</sup> at a pressure of 750 bar and a temperature of 80°C. One skilled in the art of CO<sub>2</sub> extraction would not assume that the density increase in CO<sub>2</sub>, from 820 kg/m<sup>3</sup> to 960 kg/m<sup>3</sup>, only 17%, would not make it possible to extract otherwise insoluble molecules. In fact, those skilled in the art believed that alcohol extraction was required to obtain important resins for brewing and polyphenols. Conventionally, the polyphenols have only been obtained by water extraction after a pre-extraction with a liquid solvent such as dichloromethane. However, experts believed that it was not possible to obtain the tanning agents or polyphenols with solvents such as dichloromethane, CO<sub>2</sub>, or even hexane.

Because of the foregoing, not even experts could anticipate that a relatively small increase in the density of CO<sub>2</sub> could lead to a process in which tanning agents, polyphenols, and xanthohumol can be extracted.

I hereby further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

By

  
Manfred Gehrig

Date:

February 06, 2008